

3. TRAFFIC SAFETY IN ALAMEDA

Before creating recommendations, key collision trends were analyzed to develop a targeted and data-driven approach to understanding traffic safety. This showed two main factors associated with crashes occurring in Alameda – dangerous behaviors and street design impacts. Following is a summary of crash trends related to these elements. These trends inform the actions presented later in the Plan.

The crash data used in this analysis is from the California Highway Patrol's Statewide Integrated Traffic Records System (SWITRS). The analysis includes data from 2009 to 2018, the ten most recent years of data available.² For a more detailed analysis of the crash data, refer to Appendix F: Detailed Crash Analysis.

Broadening the meaning of “traffic safety”

The Vision Zero Task Force recognizes that Black, Indigenous, and People of Color may experience traffic safety differently from their white counterparts: some may fear for their safety from police interactions, including via traffic enforcement, in addition to worrying about crashes. Everyone, regardless of where, when, or how they travel, or their demographic or economic background, should be able to feel safe while traveling on Alameda's streets.

DISPROPORTIONATE IMPACTS

Motor vehicles are involved in the highest share of crashes; however, crashes involving only motor vehicles are much less likely to result in fatal or life-changing injuries when compared to crashes that involve other road users. Crashes that involve pedestrians, bicyclists, and motorcyclists are disproportionately severe compared to motorist-only crashes. Pedestrians are involved in 18 percent of Alameda's total crashes but 35 percent of the city's severe crashes.

Certain demographic populations are also more vulnerable than others. **On average, younger and older victims (ages 10-24 and 65-84) were over-represented in severe crashes compared to other age groups.** Vulnerabilities can also be compounded, meaning that older people may be more at risk of experiencing a severe injury when walking, biking, or riding a motorcycle. Older pedestrians are especially vulnerable – 66 percent of pedestrian victims of fatal crashes were 65 years old or older, though this age group only represents 15 percent of the population.³

² The 2016-2018 data were still considered “provisional,” which means that the overall numbers could change slightly if additional reports are identified and processed. However, correspondence with the TIMS managers suggested that there were unlikely to be substantial changes from the current version, especially for 2016 values. Some fatal crashes were added or corrected during a data review with the City of Alameda and the Alameda Police Department.

³ American Community Survey, 2018, five-year estimates

Pedestrians and bicyclists make up...

5% of Alameda's commute to work mode share

39% of Alameda's crashes

62% of Alameda's severe crashes

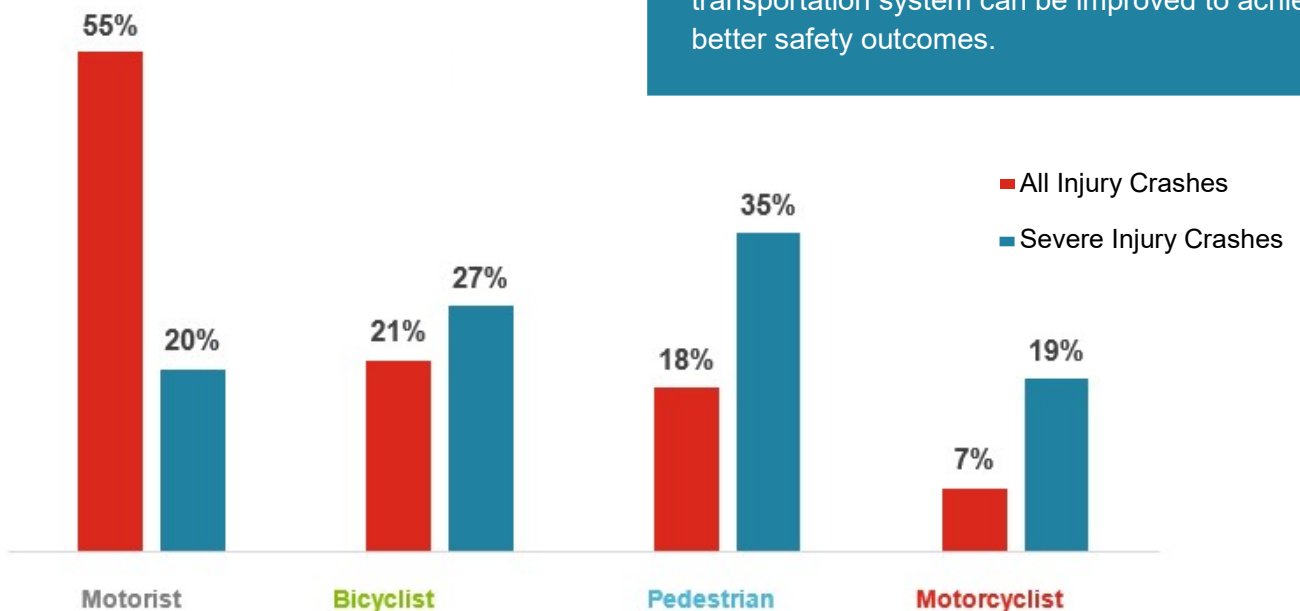


Figure 2. All Injury Crashes and Severe Injury Crashes by Mode

Source: Statewide Integrated Traffic Records System (2009-2018)

Crash Data Limitations

The crash analysis in this Plan only includes police-reported crashes. This means analysis may not reflect crashes involving someone who is uncomfortable reporting to or interacting with police, or who did not have the time or motivation to report.

Also, crash data does not capture situations where there was nearly a crash, but no crash occurred. These “near miss” situations are not crashes but they can make people feel unsafe or uncomfortable traveling on the roadway.

While police-reported crash data is known to be an underrepresentation of crashes, it is the most complete data source available and likely captures *most* crashes, especially those resulting in a death or life-changing injury. When combined with public and stakeholder input, crash analysis offers valuable insight into how the design and operation of the transportation system can be improved to achieve better safety outcomes.

41% of severe crashes occurred in a Socially Vulnerable Community while only 30% of Alameda's roadways are within a Socially Vulnerable Community.

Crashes Compared to Areas of High Social Vulnerability

Crash Analysis, 2009-2018 Data
City of Alameda

Crashes in Areas with High Social Vulnerability

- Severe Crash
- Non-severe Crash

Other Crashes

- Severe Crash
- Non-Severe Crash

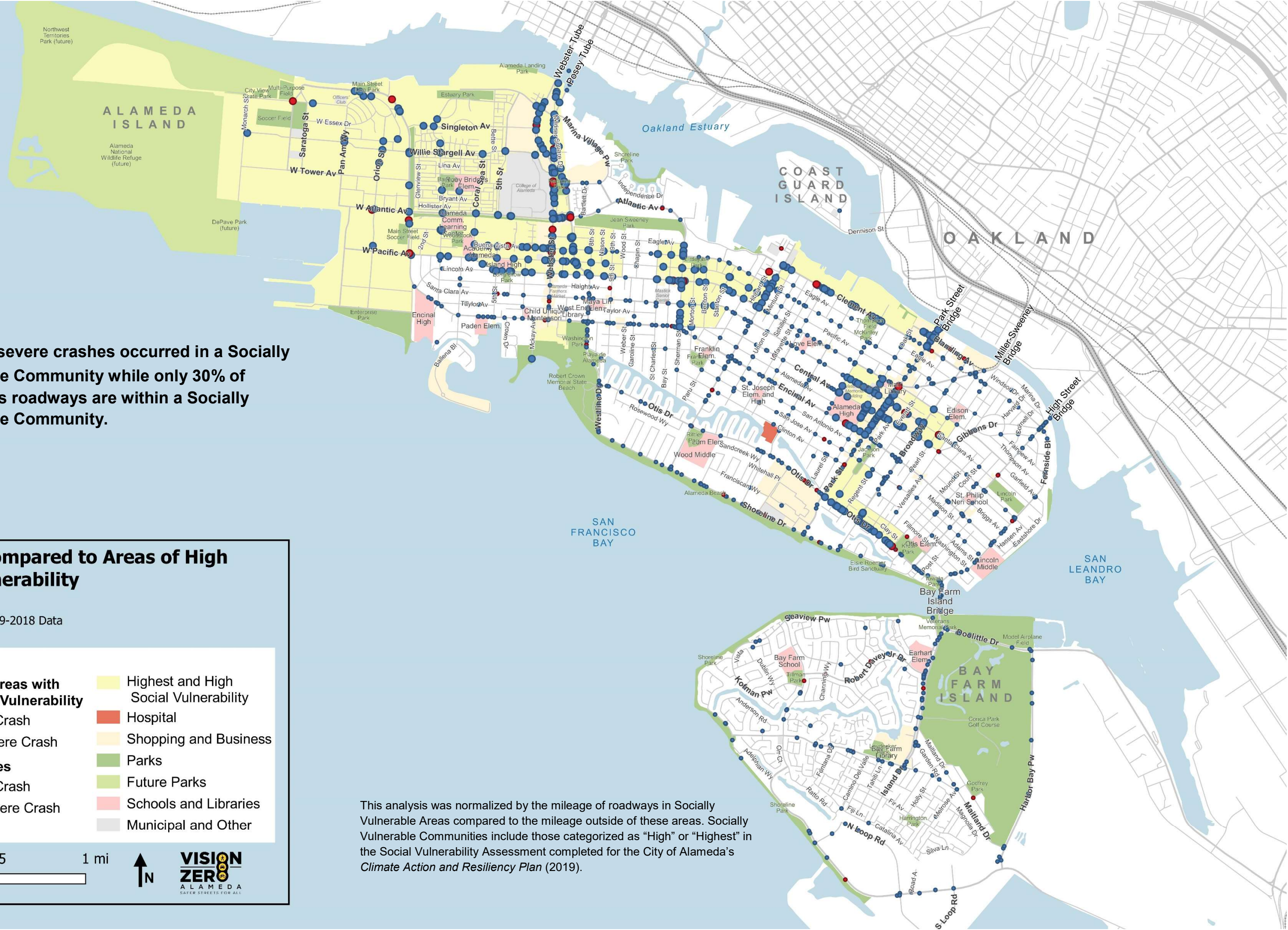
- Highest and High Social Vulnerability
- Hospital
- Shopping and Business
- Parks
- Future Parks
- Schools and Libraries
- Municipal and Other

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This analysis was normalized by the mileage of roadways in Socially Vulnerable Areas compared to the mileage outside of these areas. Socially Vulnerable Communities include those categorized as "High" or "Highest" in the Social Vulnerability Assessment completed for the City of Alameda's *Climate Action and Resiliency Plan* (2019).



DANGEROUS BEHAVIORS

Crash data includes information about actions and behaviors that may have contributed to a crash. Patterns of behavior are studied because a Vision Zero approach acknowledges and seeks to account for user error on our roadways. The crash analysis showed that in Alameda, certain behaviors are strongly associated with all crashes and some with severe crashes in particular. Alameda can take a

larger step towards reducing traffic-related injuries and deaths by focusing on strategies that will mitigate the impacts of these top dangerous behaviors. Reducing instances of these top dangerous behaviors will require everyone to do their part to walk, bike, ride, wheel, and drive safely and watch out for vulnerable road users.

Four dangerous driver behaviors are most common among ALL crashes in Alameda: failure to yield to other motorists or pedestrians, unsafe speed, and improper turning.

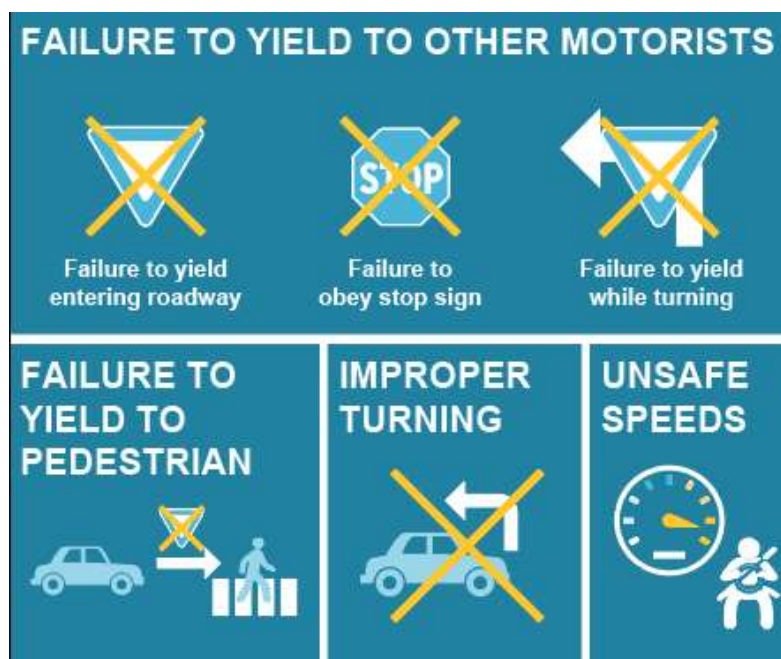


Figure 3. Top Four Behaviors Associated with All Crashes
Source: Statewide Integrated Traffic Records System (2009-2018)

The top two dangerous behaviors associated with SEVERE crashes are failure to yield to pedestrians and unsafe speed.

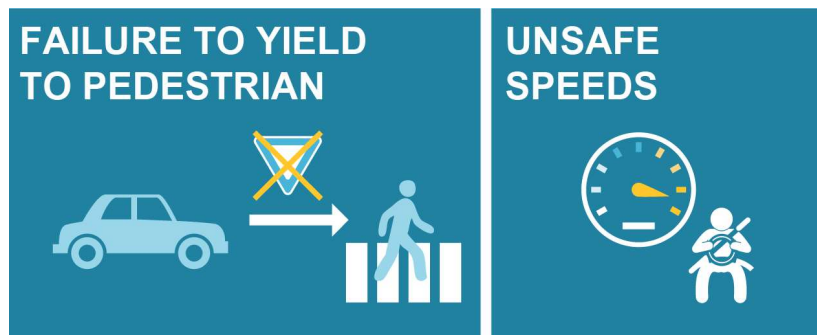


Figure 4. Top Two Behaviors Associated with Severe Crashes
Source: Statewide Integrated Traffic Records System (2009-2018)

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Among pedestrian crashes, the most common behavior leading to crashes was improper yielding, most frequently by drivers. In 55 percent of pedestrian crashes, the driver failed to yield to a pedestrian (either at a marked or unmarked crosswalk), and in 20 percent of pedestrian crashes, reports documented that a pedestrian failed to yield right of way to a driver. Pedestrians are noted as failing to yield when they cross outside of a legal crosswalk or where traffic controls indicated their responsibility to yield.⁴ People walking may be more likely to cross outside of a legal crosswalk along streets with long block lengths where there are few designated crossings.

Bicycle crashes are linked to a relatively wide range of behaviors; however, improper yielding (by both drivers and bicyclists) and improper turning were the most frequently cited traffic violations and were associated with 27 percent and 14 percent of bicycle crashes, respectively.

A few types of motorist, bicyclist, and pedestrian movements are associated with severe crashes in Alameda. The most common crash types vary by roadway user.

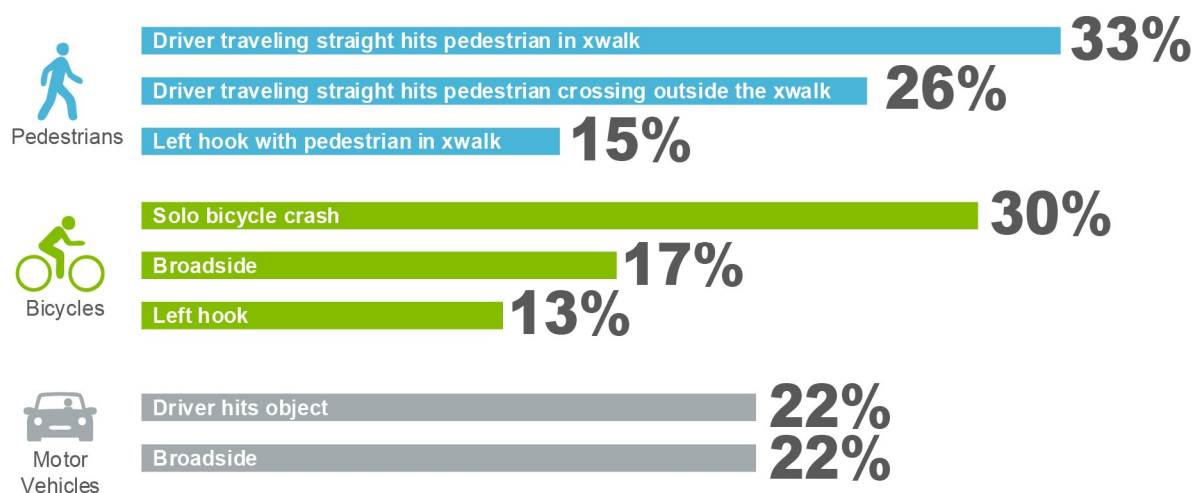


Figure 5. Most Common Road User Movements Associated with Severe Crashes

Source: Statewide Integrated Traffic Records System (2009-2018)

Broadside = T-bone crash where both road users are traveling straight in perpendicular travel paths

Left hook = one road user is traveling straight, the other is turning left



63% of crashes involving younger victims (ages 18 or younger) occurred within ¼ mile of a school while only 38% of Alameda's streets are within a ¼ mile of a school.



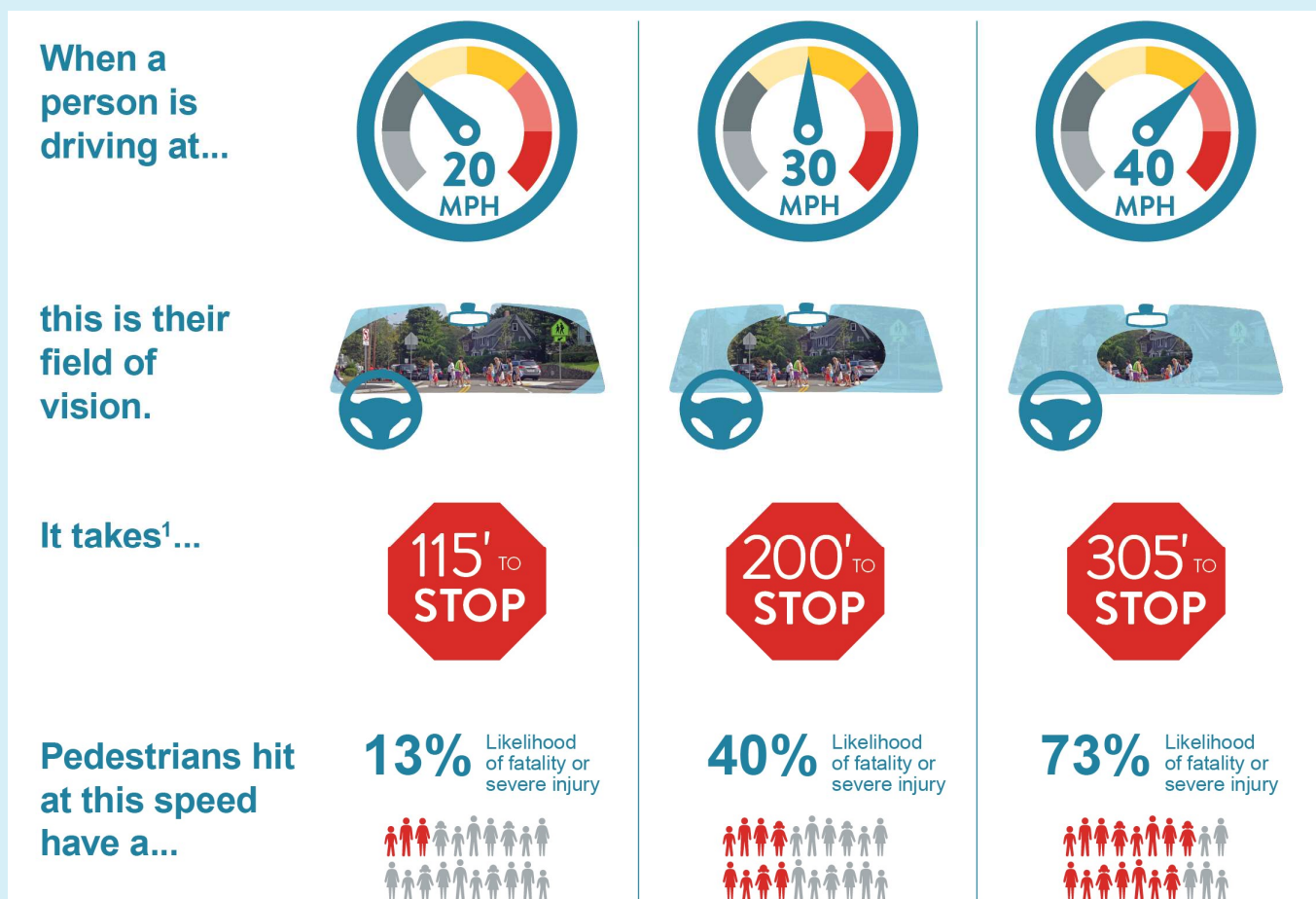
A disproportionate share of severe crashes occurred during dark conditions (with streetlights present). This trend was most pronounced among pedestrian crashes.

⁴ Drivers are required to yield to pedestrians at all legal crosswalks. According to the California Vehicle Code, all intersections, and any mid-block locations with crosswalk markings are considered legal

crosswalks. Intersection crossings that do not have marked crosswalks are still legal crosswalks. California Vehicle Code, Division 11, Chapter 5, 21950.

SPEED MATTERS

As shown in Figure 3 and Figure 4, speeding was among the top factors associated with all crashes and severe crashes in Alameda. It was associated with 26 percent of automobile-automobile crashes and 35 percent of motorcycle-involved crashes. While *unsafe speed* was only noted as a factor in a small share of crashes involving bicyclists and pedestrians, all travel at *higher* speeds has a direct influence on road user safety. Speed impacts the ability of road users to avoid a crash and impacts victim injury severity if a crash occurs. The impacts are especially significant for crashes between motor vehicles and pedestrians or bicyclists. The information presented in the image below shows that as speed increases, even by just a small increment, a driver's field of vision decreases, and the distance and time required to stop and avoid a crash increases but is less likely to be available. Dropping speeds only 10 miles per hour reduces the risk of serious injuries and fatalities by more than half. The speed limit on most Alameda streets is 25 miles per hour (mph).



¹ Includes 2.5 seconds breaking reaction time.

Sources: Bartmann, A., Spijkers, W., and Hess, M. 1991. Street Environment, Driving Speed and Field of Vision. Vision in Vehicles III. W. A. Leaf, W.A. and Preusser, D.F. Literature Review on Vehicle Travel Speeds and Pedestrian Injuries Among Selected Racial/Ethnic Groups. DTNH22-97-D-05018 Task Order 97-03. U.S. Department of Transportation, 1999. AASHTO Green Book—A Policy on Geometric Design of Highways and Streets, 7th Edition. American Association of State and Highway Transportation Officials, 2018. Teff, B. 2013. Impact Speed and a Pedestrian's Risk of Severe Injury or Death. Accident Analysis & Prevention, 50(87): 1-8. DOI: 10.1016/j.aap.2012.07.022

STREET DESIGN IMPACTS

One of the core tenets of Vision Zero is designing streets that are forgiving. While it is important for all road users to travel safely and follow the law, Alameda's streets should be designed so that a mistake does not cause a life-changing injury or death. The crash analysis indicates that certain locations are associated with a higher share of crashes than others. Implementing evidence-based design improvements at locations associated with a higher number of crashes and identifying the common design elements of these locations can help Alameda reduce the likelihood and severity of crashes that occur.

The vast majority of all crashes and severe crashes occurred at intersections, specifically unsignalized intersections. Data shows that people riding bikes are particularly vulnerable at unsignalized intersections as they are overrepresented in severe crashes at these locations relative to other road users. Additionally, public input indicated that unsignalized intersections had a higher share of near misses compared to signalized intersections or non-intersection locations.

However, a disproportionate share of crashes (and severe crashes) among all modes occurred at signals: nearly 22 percent of crashes occurred at signalized intersections and less than seven percent of intersections in Alameda are signalized. Addressing high-crash locations in Alameda will require safety solutions at both signalized and unsignalized intersections.

60% of all crashes and 62% of severe crashes occurred on arterials.

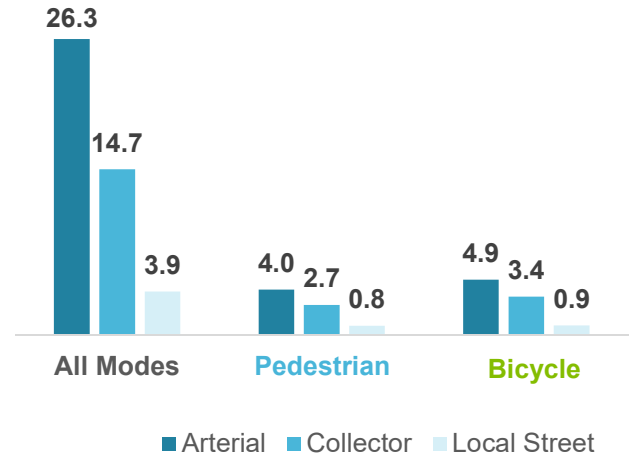


Figure 6. Number of Crashes Per Mile
Source: Statewide Integrated Traffic Records System (2009-2018)

Arterial streets are disproportionately dangerous for all road users. These types of streets have higher motor vehicle volumes than local streets, and often also have more travel lanes; examples of arterial streets include Park Street, Lincoln Avenue, and Otis Drive. These streets have a higher share of pedestrian and bicycle crashes in terms of frequency and severity on a per-mile basis. According to public input, these roadways also had a higher share of near misses (also called close calls) compared to local streets.

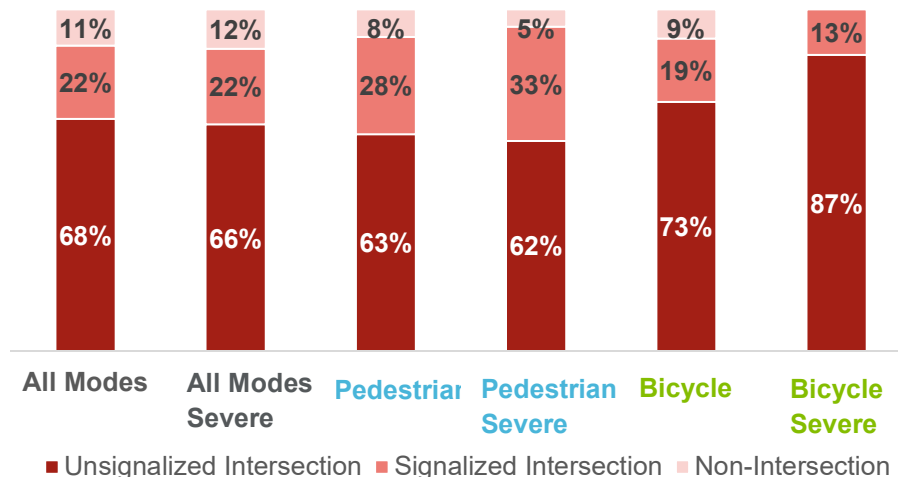


Figure 7. Location of Crashes by Mode for All Crashes and Fatal and Life-changing Injury Crashes
Source: Statewide Integrated Traffic Records System (2009-2018)

HIGH INJURY CORRIDORS

The City conducted an additional spatial analysis of crash data to identify the most dangerous streets in Alameda. These corridors, referred to as high injury corridors, were identified by selecting the streets with the highest crash densities and weighting crashes by severity. Crashes that resulted in a fatal or life-altering injury received a higher weight than other injury crashes. The crash data used for the analysis includes crashes involving all road users.

The City will use the high injury corridors to allocate funds for capital improvement projects and prioritize other traffic safety efforts to ensure efficient use of City resources. Several of the actions identified in this Vision Zero Action Plan build off of the high injury corridors analysis. By focusing on the most dangerous streets, the City can focus limited funding and staff time where they can have the biggest impact on traffic safety.



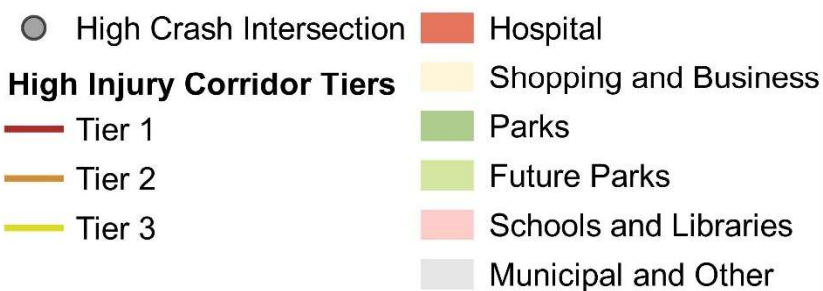
Photo credit: Maurice Ramirez

73% of crashes occurred along
20% of Alameda's roadways.

The high injury corridors map is a useful tool for focusing design improvements
and other roadway safety strategies to where they are likely to have the largest
impact on improving safety for all users.

High Crash Intersections and High Injury Corridors - All Modes

Crash Analysis, 2009-2018 Data
City of Alameda

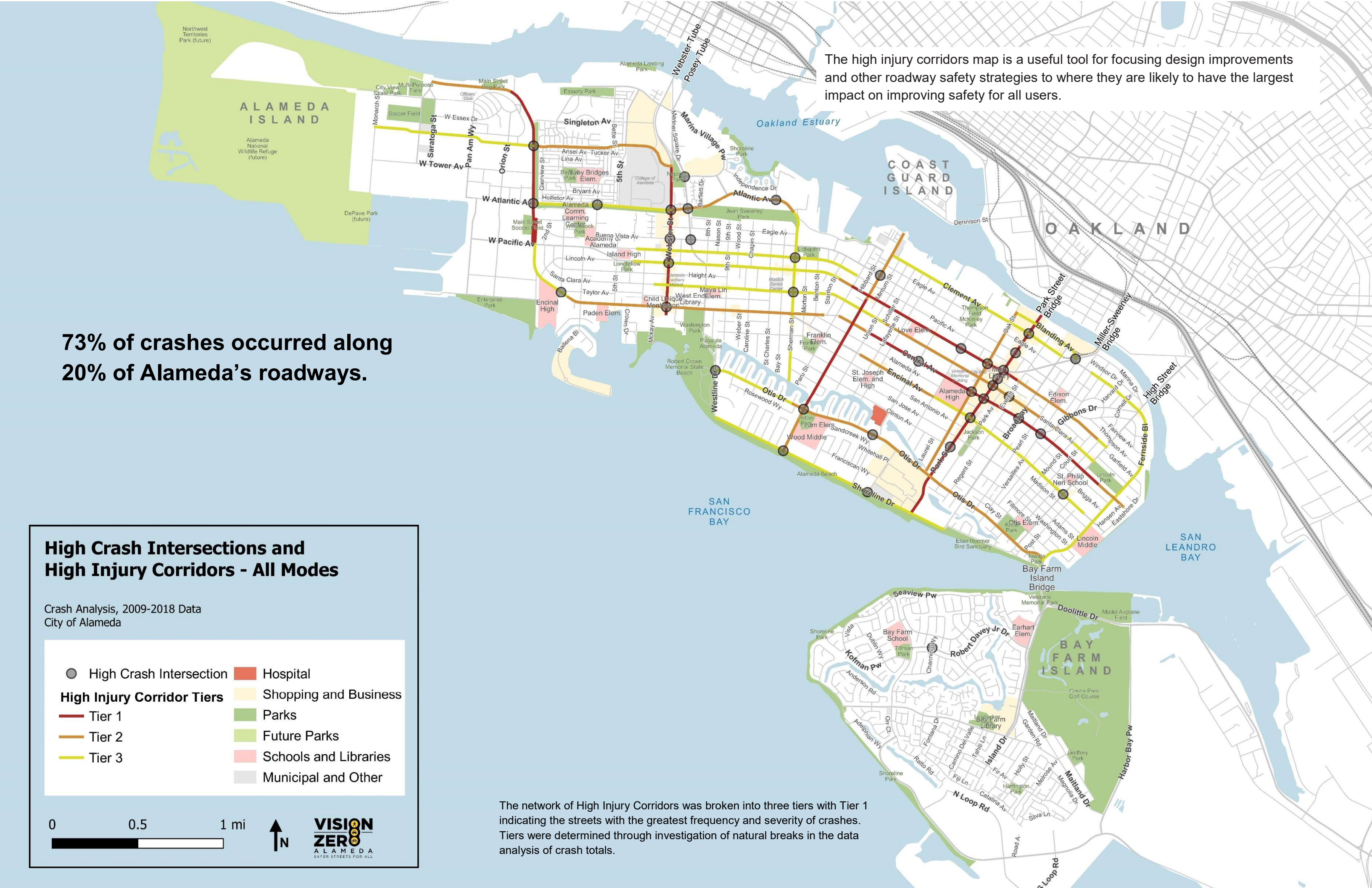


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The network of High Injury Corridors was broken into three tiers with Tier 1 indicating the streets with the greatest frequency and severity of crashes. Tiers were determined through investigation of natural breaks in the data analysis of crash totals.



This map presents the severe injury and fatal crashes that were weighted higher than less severe crashes and helped identify the High Injury Corridors and High Injury Intersections.

Severe Crashes

Crash Analysis, 2009-2018 Data
City of Alameda

- Severe Crashes (fatal and life altering injuries)
- Hospital
- Shopping and Business
- Parks
- Future Parks
- Schools and Libraries
- Municipal and Other

